

TEST REPORT

FCC/ISED BT Test for W0C-0430
FCC: Class II Permissive Change
ISED: Class IV Permissive Change

APPLICANT
JVCKENWOOD Corporation

REPORT NO.
HCT-RF-2510-FI001

DATE OF ISSUE
October 24, 2025

Tested by
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TEST REPORT

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Applicant**JVCKENWOOD Corporation**

3-12, Moriyacho, Kanagawa-ku, Yokohama-shi, Kanagawa, 221-0022, Japan

Product Name

Communication Module

Model Name

W0C-0430

FCC ID

K44515050

IC

282F-515050

Date of Test

August 18, 2025 ~ October 15, 2025

FCC Classification

FCC Part 15 Spread Spectrum Transmitter

Test Standard Used

FCC Rule Part(s): Part 15.247

ISED Rule Part(s):

RSS-247 Issue 4

RSS-Gen Issue 5_Amendment 2

Test Results

PASS

Location of Test

☒ Permanent Testing Lab ☐ On Site Testing

(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	October 24, 2025	Initial Release

Notice

Content

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC/ISED Rules under normal use and maintenance.

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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1. EUT DESCRIPTION

EUT Type	Communication Module
Model Name	W0C-0430
Power Supply Voltage	DC 13.8V $\pm$ 15%
Frequency Range	2402 MHz - 2480 MHz
Max. RF Output Power	5.562 dBm (3.60 mW)
BT Operating Mode	Normal, EDR, AFH
Modulation Type	GFSK(Normal), π /4DQPSK and 8DPSK(EDR)
Modulation Technique	FHSS
Number of Channels	79 Channels, Minimum 20 Channels(AFH)
Antenna Specification	Type: Chip antenna Peak Gain: 0.40 dBi
Serial number	Conducted: Body A1A00033, Panel 096 Radiated : Body A1A00032, Panel 048
PMN (Product Marketing Number)	W0C-0430
HVIN (Hardware Version Identification Number)	W0C-0430
FVIN (Firmware Version Identification Number)	N/A
HMN (Host Marketing Name)	TM-D750A
Test software(EUT for test)	Aoterm2_V3.03, teraterm-5.0
Host EUT description	This transmitter module has tested in the specific host devices, TM-D750A as non-stand-alone configuration.

ANTENNA CONFIGURATIONS

This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz bands simultaneously on each antenna.

Simultaneous transmission Scenario	2.4 GHz WLAN	5 GHz WLAN	BT	Test Case
Bluetooth + 2.4 GHz WLAN	on	-	on	Scenario1
Bluetooth + 5 GHz WLAN	-	on	on	Scenario2

2. REQUIREMENTS FOR BLUETOOTH TRANSMITTER (§ 15.247, RSS-247)

This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

- 1) This system is hopping pseudo-randomly.
- 2) Each frequency is used equally on the average by each transmitter.
- 3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
- 4) The receiver shifts frequencies in synchronization with the transmitted signals.
 - 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.
 - 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.
 - RSS-247 6.2.1 (a): The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3. TEST METHODOLOGY

Unlicensed Wireless Devices were tested using the following measurement procedure.

[1] KDB 558074 D01 15.247 Meas Guidance v05v02

[2] ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024

Note : Hereinafter, ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 will be referred to as ANSI C63.10-2020

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the RSS-Gen issue 5, RSS-247 issue 4.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10-2020. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

According to the requirements in Section 6.3 ~ Section 6.6 of ANSI C63.10-2020,

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes. To record the final measurements, the analyzer detector

function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector and add the DCCF calculations.

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4.

(Version :2014 and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated March 11, 2024 (Registration Number: KR0032).

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea. The site is constructed in conformance with the requirements of ANSI C63.4-2014 + C63.4a-2017 and ANSI C63.25.1-2018.

Detailed description of test facility was submitted to the Commission and accepted dated March 13, 2024 (CAB identifier: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to ANSI/USEMCSC C63.2-2023, CISPR Publication 16-1, "American National Standard for Specifications of Electromagnetic Interference and Field Strength Measuring Instrumentation in the Frequency Range 9 kHz to 40 GHz", "Radio Interference Measuring Apparatus and Measurement Methods".

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of § 15.203

According to RSS-GEN(Issue 5) Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty ($\pm$ kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)
Carrier Frequency Separation Number of Hopping Frequencies Time of Occupancy	49 (Confidence level about 95 %, $k=2$)

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Signal Analyzer)	0.68 (Confidence level about 95 %, $k=2$)
Power Spectral Density	1.03 (Confidence level about 95 %, $k=2$)
Conducted Spurious Emissions	0.70 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.68 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.75 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.82 (Confidence level about 95 %, $k=2$)

8. DESCRIPTION OF TESTS

Test Item	FCC Test Procedure
20 dB Bandwidth	- ANSI C63.10-2020 - Section 6.9.2
Occupied Bandwidth	- ANSI C63.10-2020 - Section 6.9.3
Conducted Maximum Peak Output Power	- ANSI C63.10-2020 - Section 7.8.5
Carrier Frequency Separation	- ANSI C63.10-2020 - Section 7.8.2
Number of Hopping Frequencies	- ANSI C63.10-2020 - Section 7.8.3
Time of Occupancy	- ANSI C63.10-2020 - Section 7.8.4
Conducted Spurious Emissions & Conducted Band Edge	- ANSI C63.10-2020 - Section 7.8.7
Radiated Test	- ANSI C63.10-2020 - Section 6.4 (Below 30 MHz) - ANSI C63.10-2020 - Section 6.5 (30 MHz to 1000 MHz) - ANSI C63.10-2020 - Section 6.6 & 7.8.8 (1 GHz to 40 GHz) - ANSI C63.10-2020 - Section 6.10 & 7.8.8 (Restricted-Band band-edge)
AC Power line Conducted Emissions	- ANSI C63.10-2020 - Section 6.2

Test Item	ISED Test Procedure
20 dB Bandwidth	- ANSI C63.10-2020 - Section 6.9.2 - RSS-GEN - Section 6.7
Occupied Bandwidth	- ANSI C63.10-2020 - Section 6.9.3 - RSS-GEN - Section 6.7
Conducted Maximum Peak Output Power	- ANSI C63.10-2020 - Section 7.8.5
Carrier Frequency Separation	- ANSI C63.10-2020 - Section 7.8.2
Number of Hopping Frequencies	- ANSI C63.10-2020 - Section 7.8.3
Time of Occupancy	- ANSI C63.10-2020 - Section 7.8.4
Conducted Spurious Emissions & Conducted Band Edge	- ANSI C63.10-2020 - Section 7.8.7
Radiated Test	- ANSI C63.10-2020 - Section 6.4 (Below 30 MHz) - ANSI C63.10-2020 - Section 6.5 (30 MHz to 1000 MHz) - ANSI C63.10-2020 - Section 6.6 & 7.8.8 (1 GHz to 40 GHz) - ANSI C63.10-2020 - Section 6.10 & 7.8.8 (Restricted-Band band-edge)
AC Power line Conducted Emissions	- ANSI C63.10-2020 - Section 6.2

8.1. Conducted Maximum Peak Output Power

FCC Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

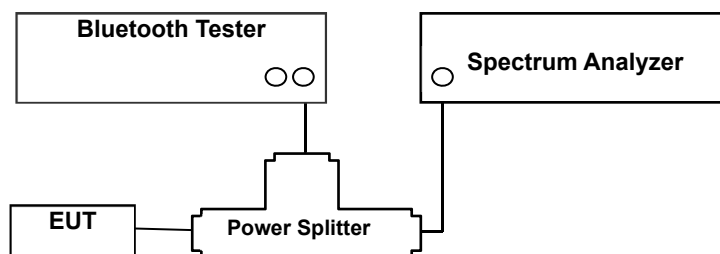
1. For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 W.
For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 W.
2. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

ISED Limit

The following transmitter output power and e.i.r.p. requirements shall apply:

1. if the hopset uses 75 or more hopping channels, the maximum peak conducted output power shall not exceed 1.0 W.
2. if the hopset uses less than 75 hopping channels the maximum peak conducted output power shall not exceed 0.125 W.
3. the e.i.r.p. shall not exceed 4 W

Test Configuration



Test Procedure

The EUT was tested with hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to

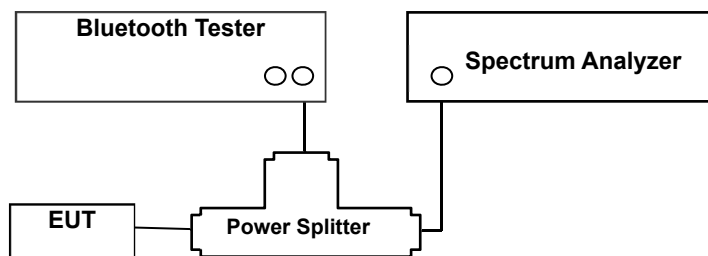
- 1) Span: approximately 5 times the 20 dB bandwidth, centered on a hopping channel
- 2) RBW > the 20 dB bandwidth of the emission being measured
- 3) VBW $\geq$ RBW
- 4) Sweep = No faster than coupled (auto) time
- 5) Detector = Peak
- 6) Trace = Max-hold
- 7) Allow trace to stabilize.
- 8) Use the marker-to-peak function to set the marker to the peak of the emission.

8.2. Conducted Band Edge(Out of Band Emissions)

Limit

According to § 15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration



Test Procedure

The EUT was tested with hopping enabled and hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

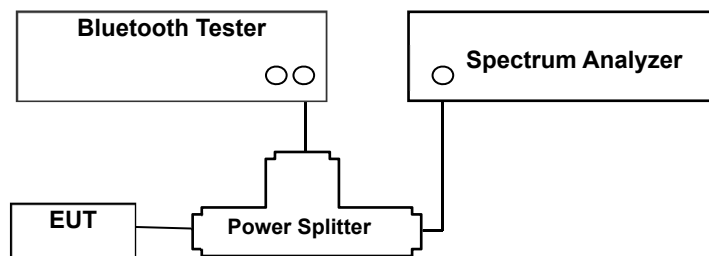
- 1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
- 2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (OBW/RBW)]$ below the reference level.
- 3) Attenuation: Auto (at least 10 dB preferred).
- 4) Sweep time: No faster than coupled (auto) time.
- 5) RBW: 100 kHz
- 6) VBW: 300 kHz
- 7) Detector: Peak
- 8) Trace: Max hold

8.3. Frequency Separation & 20 dB Bandwidth & 99% Occupied Bandwidth

Limit

According to § 15.247(a)(1), RSS-247 6.2.3.1(a), Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Configuration



Test Procedure(Frequency Separation)

The EUT was tested with hopping enabled.

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

- 1) Span: Wide enough to capture the peaks of two adjacent channels
- 2) RBW: Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
- 3) VBW $\geq$ RBW
- 4) Sweep: No faster than coupled (auto) time
- 5) Detector: Peak
- 6) Trace: Max-hold
- 7) All the trace to stabilize
- 8) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

Test Procedure (20 dB Bandwidth)

The EUT was tested with hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

- 1) Span: Set between two times and five times the OBW
- 2) RBW: 1 % to 5 % of the OBW.
- 3) VBW $\geq 3 \times$ RBW
- 4) Sweep: Auto
- 5) Detector: Peak
- 6) Trace: Max-hold
- 7) All the trace to stabilize
- 8) We tested 20 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set to 20 dB.

Test Procedure (99% Occupied Bandwidth)

The EUT was tested with hopping disabled.

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

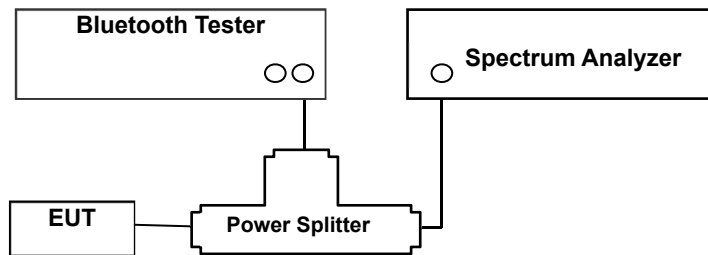
- 1) Span: Set between 1.5 times and 5.0 times the OBW
- 2) RBW: 1 % to 5 % of the OBW.
- 3) VBW $\geq 3 \times$ RBW
- 4) Sweep: Auto
- 5) Detector: Peak
- 6) Trace: Max-hold
- 7) All the trace to stabilize
- 8) Use the 99% power bandwidth function of the instrument

8.4. Number of Hopping Frequencies

Limit

According to § 15.247(a)(1)(iii), RSS-247 6.2.3.1(b), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands shall use at least 15 hopping channels.

Test Configuration



Test Procedure

The EUT was tested with hopping enabled.

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

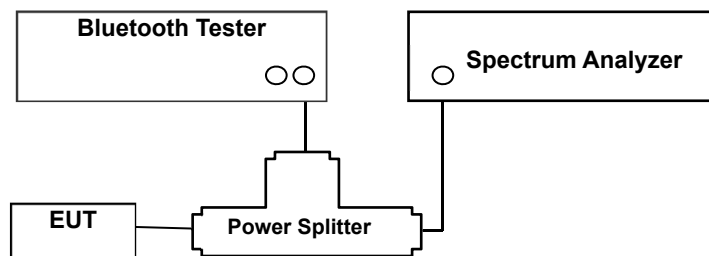
- 1) Span: The frequency band of operation
- 2) RBW: To identify clearly the individual channels, set the RBW to less than 30 % of the channel spacing or the 20 dB bandwidth, whichever is smaller.
- 3) VBW $\geq$ RBW
- 4) Sweep: No faster than coupled (auto) time
- 5) Detector: Peak
- 6) Trace: Max-hold
- 7) Allow the trace to stabilize.

8.5. Time of Occupancy

Limit

According to § 15.247(a)(1)(iii), RSS-247 6.2.3.1(b), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands, the average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



Test Procedure

The EUT was tested with hopping enabled.

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

- 1) Span: Zero span, centered on a hopping channel
- 2) RBW shall be $\leq$ channel spacing and where possible RBW should be set $\gg 1/T$, where T is the expected transmission time per hop.
- 3) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. (To be slightly longer than the hopping period per channel)
- 4) The video trigger is set with trigger delay, and the trigger level is adjusted as needed to clearly capture the start of transmission and reduce false triggers caused by adjacent channels.
- 5) Detector: Peak
- 6) Trace: Clear-write, single sweep.
- 7) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.

Sample Calculation

The following calculation process is not relevant to our measurement results. It is just an example.

(1) Non-AFH Mode

- DH 5 (GFSK) : $2.890 \times (1600/6)/79 \times 31.6 = 308.27 \text{ (ms)}$
- 2-DH 5 ($\pi/4$ DQPSK) : $2.890 \times (1600/6)/79 \times 31.6 = 308.27 \text{ (ms)}$
- 3-DH 5 (8DPSK) : $2.890 \times (1600/6)/79 \times 31.6 = 308.27 \text{ (ms)}$

(2) AFH Mode

- DH 5 (GFSK) : $2.890 \times (800/6)/20 \times 8.0 = 154.13 \text{ (ms)}$
- 2-DH 5 ($\pi/4$ DQPSK) : $2.890 \times (800/6)/20 \times 8.0 = 154.13 \text{ (ms)}$
- 3-DH 5 (8DPSK) : $2.890 \times (800/6)/20 \times 8.0 = 154.13 \text{ (ms)}$

Note :

DH5 Packet needs 5 time slots for transmitting and 1 time slot for receiving. In the worst case, the system performs 1600/6 hops per second with 79 channels. Consequently, each channel is used 3.3755 times per second, resulting in 106.667 occurrences over 31.6 seconds.

Each tx-time per appearance of DH5 is 2.890 ms.

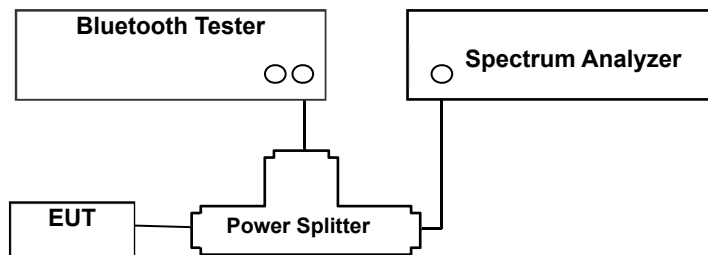
Dwell time = Tx-time x 106.667 = 308.27 (ms)

8.6. Conducted Spurious Emissions

Limit

Conducted > 20 dBc

Test Configuration



Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The EUT was tested with hopping disabled.

The transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer is set to

- 1) Span: 30 MHz to 10 times the operating frequency in GHz.
- 2) RBW: 100 kHz
- 3) VBW: 300 kHz
- 4) Sweep time : Coupled
- 5) Detector: Peak

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.19
100	20.18
200	20.14
300	20.27
400	20.48
500	20.31
600	20.32
700	20.40
800	20.40
900	20.38
1000	20.46
2000	20.77
2400	20.86
3000	20.91
4000	21.01
5000	21.05
5850	21.11
6000	21.74
7000	21.90
8000	21.55
9000	22.77
10000	21.71
11000	21.38
12000	21.79
13000	21.54
14000	21.98
15000	22.42
16000	22.18
17000	22.72
18000	22.48
19000	22.56
20000	22.62
21000	23.01
22000	22.88
23000	22.84
24000	22.99
25000	22.79

Note : 1. 2400 ~ 2500 MHz is fundamental frequency range.

2. Factor = Attenuator loss + Cable loss

3. EUT cable loss = 0.25 dB

4. Total Port offset = 21.11 dB

8.7. Radiated Test

FCC Limit

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

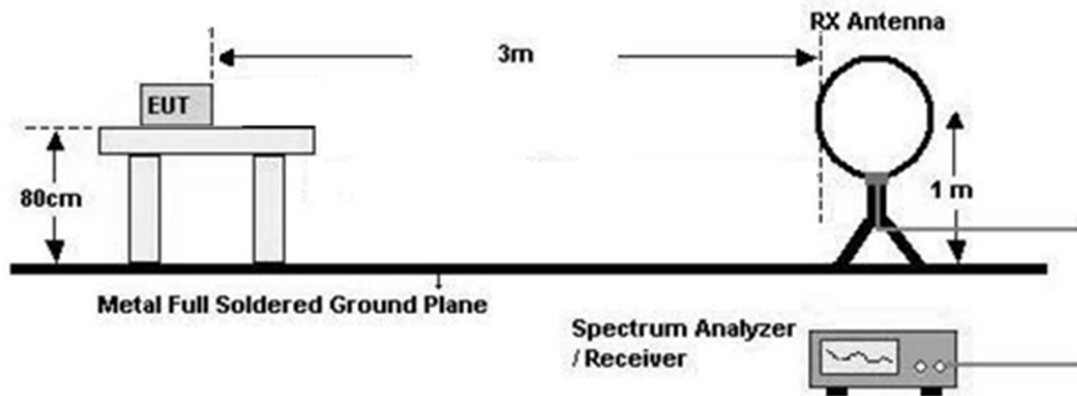
ISED Limit

Frequency (MHz)	Field Strength ($\mu\text{A/m}$)	Measurement Distance (m)
0.009 – 0.490	$6.37/F$ (F in kHz)	300
0.490 – 1.705	$63.7/F$ (F in kHz)	30
1.705 – 30	0.08	30

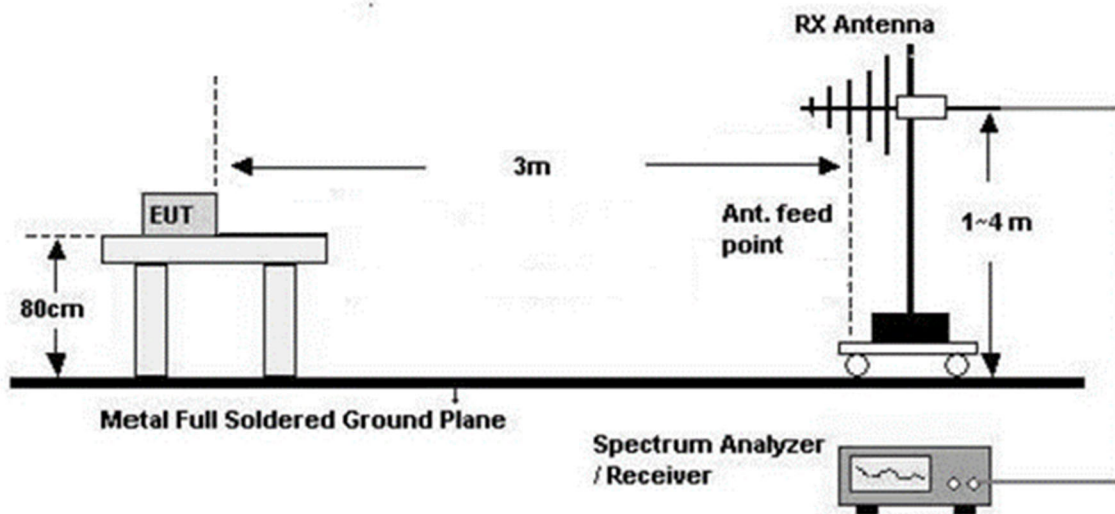
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

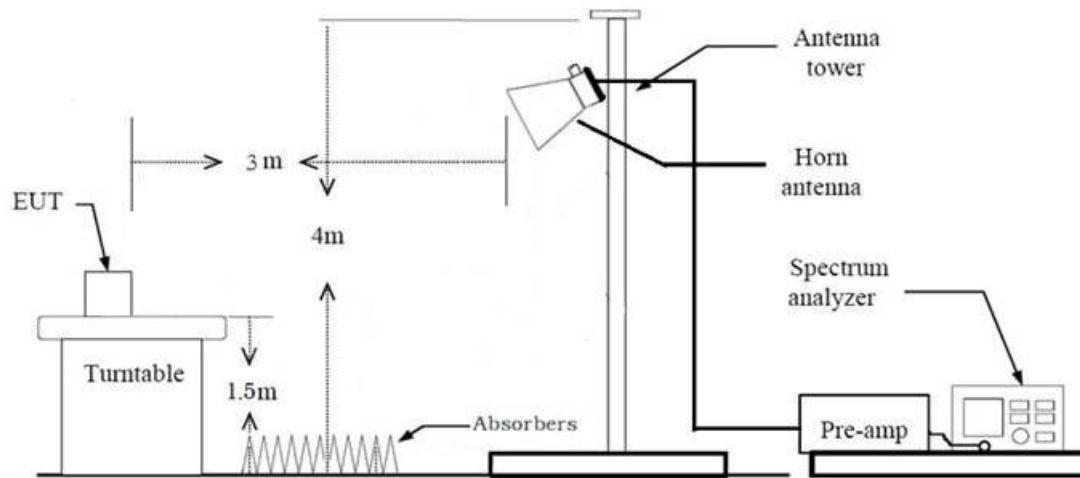
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ RBW
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

6. Spectrum Setting**(1) Measurement Type(Peak):**

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

※In general, (1) is used mainly

7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. Radiated test is performed with hopping disabled.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

8. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

(2) Measurement Type(Average):

- Average value of pulsed emissions
- From the peak value of the emission : The measured peak value in dBuV/m is corrected by $20\log(\text{maximum dwell time in } 100 \text{ ms} / 100)$.
- ◆ $DH5 = 20\log(\text{Maximum dwell time} / 100\text{ms}) \text{ dB} = -24.731 \text{ dB}$
- ◆ $2\text{-}DH5, 3\text{-}DH5 = 20\log(\text{Maximum dwell time} / 100\text{ms}) \text{ dB} = -18.711 \text{ dB}$

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance}) \text{ (dB)}$

11. Total(Measurement Type : Peak)

= Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp

Gain(A.G)

Total(Measurement Type : Average)

= Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp

Gain(A.G) + D.C.C.F(AFH)

12. Duty Cycle Correction Factor (79 channel hopping)

- a. Time to cycle through all channels = $\Delta t = \tau \text{ [ms]} \times 79 \text{ channels} = 229.100 \text{ ms}$, where τ = pulse width
- b. $100 \text{ ms} / \Delta t \text{ [ms]} = H \rightarrow$ Round up to next highest integer, $H' = 1$
- c. Worst Case Dwell Time = $\tau \text{ [ms]} \times H' = 2.9 \text{ ms}$
- d. Channel separation correction = 1 (DH5, 2-DH5, 3-DH5)
- e. Overlapping channel correction
- (1) DH5 : = 0

(2) 2-DH5, 3-DH5 = 1

f. Maximum dwell time

(1) DH5 = 2.9ms X (1 + 0) = 2.9 ms

(2) 2-DH5, 3-DH5 = 2.9ms X (1 + 1) = 5.8 ms

g. Duty Cycle Correction

(1) DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -30.752 dB

(2) 2-DH5, 3-DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -24.731 dB

13. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)

a. Time to cycle through all channels= $\Delta t = \tau [\text{ms}] \times 20 \text{ channels} = 58.00 \text{ ms}$, where τ = pulse width

b. $100 \text{ ms} / \Delta t [\text{ms}] = H \rightarrow$ Round up to next highest integer, $H' = 2$

c. Worst Case Dwell Time = $\tau [\text{ms}] \times H' = 5.8 \text{ ms}$

d. Channel separation correction = 1 (DH5, 2DH5, 3DH5)

e. Overlapping channel correction

(1) DH5 := 0

(2) 2DH5, 3DH5 = 1

f. Maximum dwell time

(1) DH5 = 5.8 ms X (1 + 0) = 5.8 ms

(2) 2-DH5, 3-DH5 = 5.8 ms X (1 + 1) = 11.6 ms

g. Duty Cycle Correction

(1) DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -24.731 dB

(2) 2-DH5, 3-DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -18.711 dB

Test Procedure of Radiated Restricted Band Edge

1. Radiated test is performed with hopping disabled.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Detector = Peak
 - Trace = Max hold
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - (2) Measurement Type(Average):
 - Average value of pulsed emissions
 - From the peak value of the emission: The measured peak value in dBuV/m is corrected by $20\log(\text{maximum dwell time in } 100 \text{ ms} / 100)$.
 - ◆ $\text{DH5} = 20\log(\text{Maximum dwell time} / 100\text{ms}) \text{ dB} = -24.731 \text{ dB}$
 - ◆ $2\text{-DH5}, 3\text{-DH5} = 20\log(\text{Maximum dwell time} / 100\text{ms}) \text{ dB} = -18.711 \text{ dB}$
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
9. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance}) \text{ (dB)}$
10. Total(Measurement Type : Peak) = Measured Value(Peak)
Total(Measurement Type : Average) = Measured Value(Peak) + D.C.C.F(AFH)
 - We apply to the offset in range 1 GHz - 18 GHz
 - The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
11. Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels = $\Delta t = \tau [\text{ms}] \times 79 \text{ channels} = 229.100 \text{ ms}$, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t [\text{ms}] = H \rightarrow$ Round up to next highest integer, $H' = 1$
 - c. Worst Case Dwell Time = $\tau [\text{ms}] \times H' = 2.9 \text{ ms}$
 - d. Channel separation correction = 1 (DH5, 2DH5, 3DH5)
 - e. Overlapping channel correction
 - (1) DH5 : = 0

(2) 2-DH5, 3-DH5 = 1

f. Maximum dwell time

(1) DH5 = 2.9ms X (1 + 0) = 2.9 ms

(2) 2-DH5, 3-DH5 = 2.9ms X (1 + 1) = 5.8 ms

g. Duty Cycle Correction

(1) DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -30.752 dB

(2) 2-DH5, 3-DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -24.731 dB

12. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)

a. Time to cycle through all channels= $\Delta t = \tau [\text{ms}] \times 20 \text{ channels} = 58.00 \text{ ms}$, where τ = pulse width

b. $100 \text{ ms} / \Delta t [\text{ms}] = H \rightarrow$ Round up to next highest integer, $H' = 2$

c. Worst Case Dwell Time = $\tau [\text{ms}] \times H' = 5.8 \text{ ms}$

d. Channel separation correction = 1 (DH5, 2DH5, 3DH5)

e. Overlapping channel correction

(1) DH5 := 0

(2) 2-DH5, 3-DH5 = 1

f. Maximum dwell time

(1) DH5 = 5.8 ms X (1 + 0) = 5.8 ms

(2) 2-DH5, 3-DH5 = 5.8 ms X (1 + 1) = 11.6 ms

g. Duty Cycle Correction

(1) DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -24.731 dB

(2) 2-DH5, 3-DH5 = $20\log(\text{Maximum dwell time} / 100\text{ms})$ dB = -18.711 dB

8.8. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 ^(a)	56 to 46 ^(a)
0.50 to 5	56	46
5 to 30	60	50

^(a)Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.
5. The EUT is the device operating below 30MHz.
 - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
 - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Sample Calculation

Quasi-peak(Final Result) = Measured Value + Correction Factor

8.9. Receiver Spurious Emissions

Limit

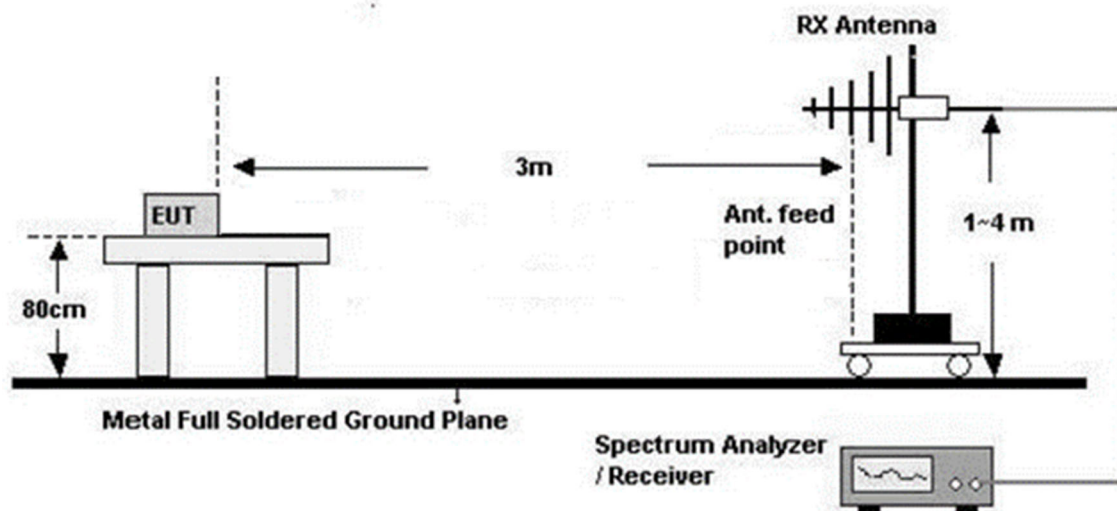
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

Measurements for compliance with the limits in table may be performed at distances other than 3 meters.

Test Configuration

30 MHz - 1 GHz



Test Procedure of Receiver Spurious Emissions (Below 1GHz)

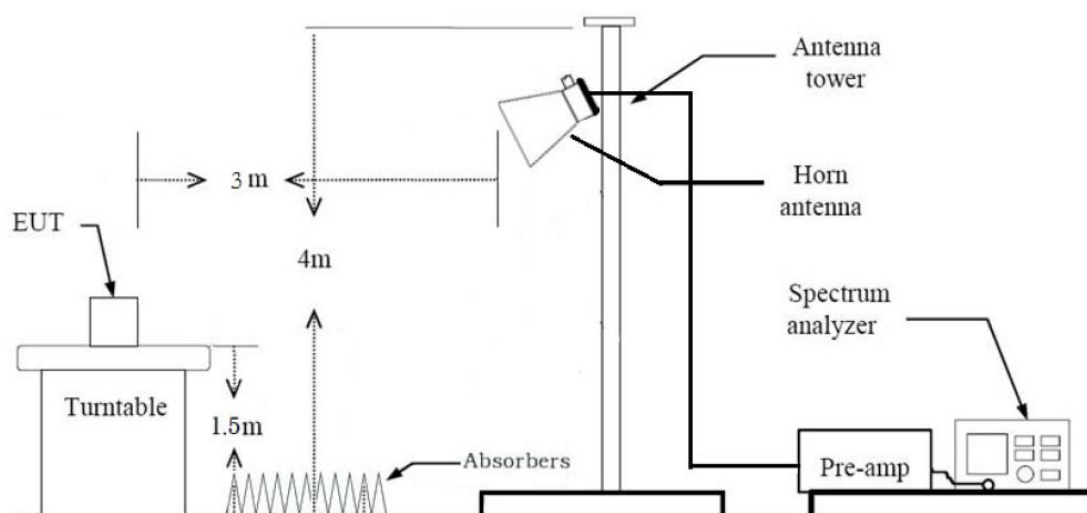
1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

6. Spectrum Setting**(1) Measurement Type(Peak):**

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max-hold
- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) – Amp Gain(A.G)**Above 1 GHz**

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Spectrum Setting
 - (1) Measurement Type(Average):
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Average(RMS)
 - Trace = Average
 - Trace was allowed to stabilize
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

8.10. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories (Microphone, Speaker, etc)
 - Worstcase : Stand alone + External accessories (Microphone, Speaker, etc)
2. EUT Axis
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : Y
3. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
 - Position : Horizontal, Vertical, Parallel to the ground plane
4. All data rate of operation were investigated and the test results are worst case in highest data rate of each mode.
 - GFSK : DH5
 - $\pi/4$ DQPSK : 2-DH5
 - 8DPSK : 3-DH5

Conducted test

1. The EUT was configured with data rate of highest power.
 - GFSK : DH5
 - $\pi/4$ DQPSK : 2-DH5
 - 8DPSK : 3-DH5

AC Power line Conducted Emissions

1. Not Tested.

Radiated test(Simultaneous transmission Scenario)

1. All modes of operation were investigated and the worst case configuration results are reported.

- Mode : Stand alone, Stand alone + External accessories(Earphone., etc)
- Worstcase : Stand alone + External accessories(Earphone., etc)

2. EUT Axis

- Radiated Spurious Emissions : Y, X

3. All of Simultaneous transmission Scenario were investigated and the worst case configuration results are reported.

Simultaneous transmission Scenario	2.4 GHz WLAN	5 GHz WLAN	BT	Test Case
Bluetooth + 2.4 GHz WLAN	on	-	on	Scenario1
Bluetooth + 5 GHz WLAN	-	on	on	Scenario2

4. The Simultaneous transmission Scenario mode test investigated both intermodulation and radiated spurious emissions.

And the worst results were reported.

- Worst result: Radiated spurious emissions
- Intermodulation: No signals are generated.
- Radiated spurious emissions: cf. Section 10.2.

5. The simultaneous transmission scenario mode was tested under the following conditions.

.- Bluetooth: The EUT is set to a normal “paired” mode with another Bluetooth device.

.- Wireless LAN: The EUT was set to a connection with access point according to the normal intended use of the product, and to facilitate testing, it was configured to transmit at a high duty cycle through file transfer.

Test Case	Description	Bluetooth Emission	2.4 GHz Emission
Scenario1	Channel	-	1
	Data Rate	-	MCS 0
	Mode	Hopping	802.11n

Note : DTS Simultaneous transmission Scenario Data refer to [DTS] Test Report.

Test Case	Description	Bluetooth Emission	5 GHz Emission
Scenario2	Channel	-	157
	Data Rate	-	6 Mbps
	Mode	Hopping	802.11a

Note : UNII Simultaneous transmission Scenario Data refer to [UNII] Test Report.

9. SUMMARY TEST OF RESULTS

Test Item	FCC Part Section(s)	Test Limit	Test Condition	Test Result	Status
20 dB Bandwidth	§ 15.247(a)(1)	N/A	Conducted	PASS	NT ^{Note2}
Occupied Bandwidth	N/A	N/A		PASS	NT ^{Note2}
Conducted Maximum Peak Output Power	§ 15.247(b)(1)	<0.125 W		PASS	C ^{Note4}
Carrier Frequency Separation	§ 15.247(a)(1)	>25 kHz or >2/3 of the 20 dB BW		PASS	NT ^{Note2}
Number of Hopping Frequencies	§ 15.247(a)(1)(iii)	≥ 15		PASS	NT ^{Note2}
Time of Occupancy	§ 15.247(a)(1)(iii)	< 400 ms		PASS	NT ^{Note2}
Conducted Spurious Emissions	§ 15.247(d)	> 20 dB for all out-of band emissions		PASS	NT ^{Note2}
Conducted Band Edge (Out of Band Emissions)	§ 15.247(d)	> 20 dB for all out-of band emissions		PASS	NT ^{Note2}
AC Power line Conducted Emissions	§ 15.207(a)	cf. Section 8.8		PASS	NT ^{Note2}
Radiated Spurious Emissions	§ 15.247(d), 15.205, 15.209	cf. Section 8.7	Radiated	PASS	C ^{Note3}
Radiated Restricted Band Edge	§ 15.247(d), 15.205, 15.209	cf. Section 8.7		PASS	C ^{Note3}

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C2PC model is electrically identical to the Original model.
3. The data from that application has been verified through fully tests to demonstrate compliance of this device, as shown in the test results in Section 10.
4. The output power was verified to be within the tuning tolerance and the original output power range, as shown in the test results in Section 10.

Test Description	ISED Part Section(s)	Test Limit	Test Condition	Test Result	Status
20 dB Bandwidth	RSS-247, 6.2	N/A	Conducted	PASS	NT ^{Note2}
Occupied Bandwidth	RSS-GEN, 6.7	N/A		PASS	NT ^{Note2}
Conducted Maximum Peak Output Power	RSS-247, 6.2.3.1 (a)	< 0.125 W		PASS	C ^{Note4}
Carrier Frequency Separation	RSS-247, 6.2.3.1 (a)	> 25 kHz or >2/3 of the 20dB BW		PASS	NT ^{Note2}
Number of Hopping Frequencies	RSS-247, 6.2.3.1 (b)	≥ 15		PASS	NT ^{Note2}
Time of Occupancy	RSS-247, 6.2.3.1 (b)	< 400 ms		PASS	NT ^{Note2}
Conducted Spurious Emissions	RSS-247, 6.6	> 20 dB for all out-of band emissions		PASS	NT ^{Note2}
Band Edge (Out of Band Emissions)	RSS-247, 6.6	> 20 dB for all out-of band emissions		PASS	NT ^{Note2}
AC Power line Conducted Emissions	RSS-GEN, 8.8	cf. Section 8.8		PASS	NT ^{Note2}
Radiated Spurious Emissions	RSS-GEN, 8.9	cf. Section 8.7	Radiated	PASS	C ^{Note4}
Radiated Restricted Band Edge	RSS-GEN, 8.9 RSS-GEN, 8.10	cf. Section 8.7		PASS	C ^{Note4}
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.3	cf. Section 8.9		PASS	C ^{Note4}

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C4PC model is electrically identical to the Original model.
3. The data from that application has been verified through fully tests to demonstrate compliance of this device, as shown in the test results in Section 10.
4. The output power was verified to be within the tuning tolerance and the original output power range, as shown in the test results in Section 10.

10. TEST RESULT

10.1 Peak Power

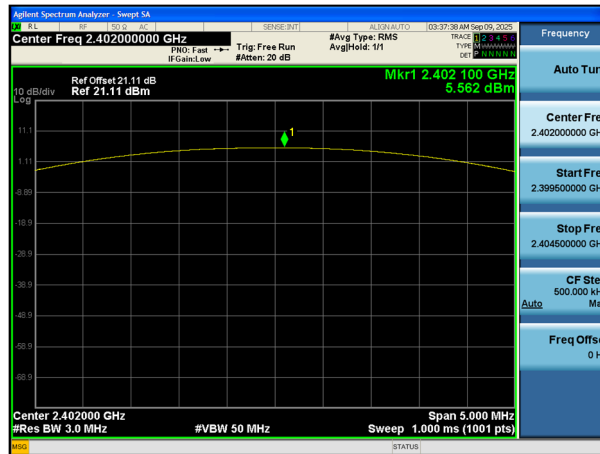
Mode	Frequency [MHz]	Channel No.	Peak Power [dBm]	Limit (mW)
GFSK	2402	0	5.562	125
	2441	39	4.898	
	2480	78	5.369	
$\pi/4$ DQPSK	2402	0	3.198	
	2441	39	3.597	
	2480	78	3.543	
8DPSK	2402	0	2.768	
	2441	39	3.185	
	2480	78	3.120	

TEST PLOTS

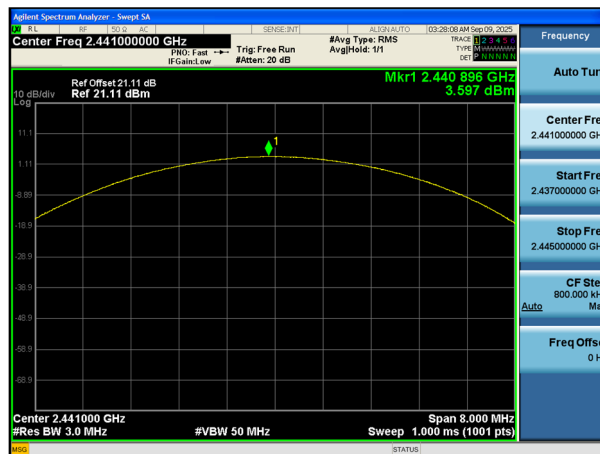
Note :

In order to simplify the report, attached plots were only the worst case channel.

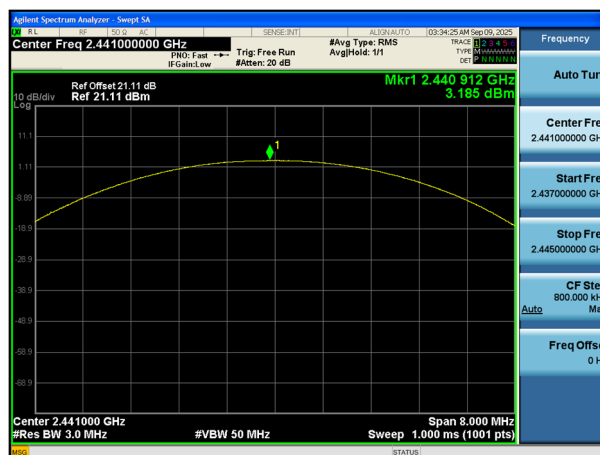
GFSK : Peak Power (CH. 0)



$\pi/4$ DQPSK : Peak Power (CH. 39)



8DPSK : Peak Power (CH. 39)



10.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+C.L+D.F	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor
4. Radiated test is performed with hopping off.

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
2. Radiated test is performed with hopping off.

Frequency Range : Above 1 GHz

Operation Mode	Normal(GFSK)
Operation Frequency	2 402 MHz
Channel No	0

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4804	41.65	4.78	V	0.00	46.43	73.98	27.55	PK
4804	41.65	4.78	V	-24.73	21.70	53.98	32.28	AV
7206	39.60	12.53	V	0.00	52.13	73.98	21.85	PK
7206	39.60	12.53	V	-24.73	27.39	53.98	26.59	AV
4804	41.47	4.78	H	0.00	46.25	73.98	27.73	PK
4804	41.47	4.78	H	-24.73	21.52	53.98	32.46	AV
7206	39.27	12.53	H	0.00	51.80	73.98	22.18	PK
7206	39.27	12.53	H	-24.73	27.06	53.98	26.92	AV

Operation Mode	Normal(GFSK)
Operation Frequency	2 441 MHz
Channel No	39

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4882	41.40	5.26	V	0.00	46.66	73.98	27.32	PK
4882	41.40	5.26	V	-24.73	21.93	53.98	32.05	AV
7323	39.58	12.51	V	0.00	52.09	73.98	21.89	PK
7323	39.58	12.51	V	-24.73	27.36	53.98	26.62	AV
4882	41.28	5.26	H	0.00	46.54	73.98	27.44	PK
4882	41.28	5.26	H	-24.73	21.81	53.98	32.17	AV
7323	39.43	12.51	H	0.00	51.94	73.98	22.04	PK
7323	39.43	12.51	H	-24.73	27.21	53.98	26.77	AV

Operation Mode	Normal(GFSK)
Operation Frequency	2 480 MHz
Channel No	78

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4960	41.88	5.77	V	0.00	47.65	73.98	26.33	PK
4960	41.88	5.77	V	-24.73	22.92	53.98	31.06	AV
7440	39.52	12.40	V	0.00	51.92	73.98	22.06	PK
7440	39.52	12.40	V	-24.73	27.19	53.98	26.79	AV
4960	41.46	5.77	H	0.00	47.23	73.98	26.75	PK
4960	41.46	5.77	H	-24.73	22.50	53.98	31.48	AV
7440	39.41	12.40	H	0.00	51.81	73.98	22.17	PK
7440	39.41	12.40	H	-24.73	27.08	53.98	26.90	AV

Operation Mode	EDR ($\pi/4$ DQPSK)
Operation Frequency	2 402 MHz
Channel No	0

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4804	41.53	4.78	V	0.00	46.31	73.98	27.67	PK
4804	41.53	4.78	V	-18.71	27.60	53.98	26.38	AV
7206	39.18	12.53	V	0.00	51.71	73.98	22.27	PK
7206	39.18	12.53	V	-18.71	32.99	53.98	20.99	AV
4804	41.38	4.78	H	0.00	46.16	73.98	27.82	PK
4804	41.38	4.78	H	-18.71	27.45	53.98	26.53	AV
7206	39.13	12.53	H	0.00	51.66	73.98	22.32	PK
7206	39.13	12.53	H	-18.71	32.94	53.98	21.04	AV

Operation Mode	EDR ($\pi/4$ DQPSK)
Operation Frequency	2 441 MHz
Channel No	39

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4882	41.43	5.26	V	0.00	46.69	73.98	27.29	PK
4882	41.43	5.26	V	-18.71	27.98	53.98	26.00	AV
7323	39.58	12.51	V	0.00	52.09	73.98	21.89	PK
7323	39.58	12.51	V	-18.71	33.38	53.98	20.60	AV
4882	41.26	5.26	H	0.00	46.52	73.98	27.46	PK
4882	41.26	5.26	H	-18.71	27.81	53.98	26.17	AV
7323	39.36	12.51	H	0.00	51.87	73.98	22.11	PK
7323	39.36	12.51	H	-18.71	33.16	53.98	20.82	AV

Operation Mode	EDR ($\pi/4$ DQPSK)
Operation Frequency	2 480 MHz
Channel No	78

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4960	41.74	5.77	V	0.00	47.51	73.98	26.47	PK
4960	41.74	5.77	V	-18.71	28.80	53.98	25.18	AV
7440	39.52	12.40	V	0.00	51.92	73.98	22.06	PK
7440	39.52	12.40	V	-18.71	33.21	53.98	20.77	AV
4960	41.35	5.77	H	0.00	47.12	73.98	26.86	PK
4960	41.35	5.77	H	-18.71	28.41	53.98	25.57	AV
7440	39.40	12.40	H	0.00	51.80	73.98	22.18	PK
7440	39.40	12.40	H	-18.71	33.09	53.98	20.89	AV

Operation Mode	EDR (8DPSK)
Operation Frequency	2 402 MHz
Channel No	0

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4804	41.50	4.78	V	0.00	46.28	73.98	27.70	PK
4804	41.50	4.78	V	-18.71	27.57	53.98	26.41	AV
7206	39.27	12.53	V	0.00	51.80	73.98	22.18	PK
7206	39.27	12.53	V	-18.71	33.08	53.98	20.90	AV
4804	41.36	4.78	H	0.00	46.14	73.98	27.84	PK
4804	41.36	4.78	H	-18.71	27.43	53.98	26.55	AV
7206	39.11	12.53	H	0.00	51.64	73.98	22.34	PK
7206	39.11	12.53	H	-18.71	32.92	53.98	21.06	AV

Operation Mode	EDR (8DPSK)
Operation Frequency	2 441 MHz
Channel No	39

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB]	[dB μ V/m]	[dB μ V/m]	[dB]	
4882	41.38	5.26	V	0.00	46.64	73.98	27.34	PK
4882	41.38	5.26	V	-18.71	27.93	53.98	26.05	AV
7323	39.56	12.51	V	0.00	52.07	73.98	21.91	PK
7323	39.56	12.51	V	-18.71	33.36	53.98	20.62	AV
4882	41.19	5.26	H	0.00	46.45	73.98	27.53	PK
4882	41.19	5.26	H	-18.71	27.74	53.98	26.24	AV
7323	39.38	12.51	H	0.00	51.89	73.98	22.09	PK
7323	39.38	12.51	H	-18.71	33.18	53.98	20.80	AV

Operation Mode	EDR (8DPSK)
Operation Frequency	2 480 MHz
Channel No	78

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4960	41.78	5.77	V	0.00	47.55	73.98	26.43	PK
4960	41.78	5.77	V	-18.71	28.84	53.98	25.14	AV
7440	39.53	12.40	V	0.00	51.93	73.98	22.05	PK
7440	39.53	12.40	V	-18.71	33.22	53.98	20.76	AV
4960	41.40	5.77	H	0.00	47.17	73.98	26.81	PK
4960	41.40	5.77	H	-18.71	28.46	53.98	25.52	AV
7440	39.43	12.40	H	0.00	51.83	73.98	22.15	PK
7440	39.43	12.40	H	-18.71	33.12	53.98	20.86	AV

[Simultaneous transmission Scenario]

Scenario1

Bluetooth Hopping Mode + 2.4 GHz 802.11n_Ch.1

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	49.76	5.26	V	0.00	55.02	73.98	18.96	PK
4882	49.76	5.26	V	-18.71	36.31	53.98	17.67	AV
7323	40.37	12.51	V	0.00	52.88	73.98	21.10	PK
7323	40.37	12.51	V	-18.71	34.17	53.98	19.81	AV
4882	49.98	5.26	H	0.00	55.24	73.98	18.74	PK
4882	49.98	5.26	H	-18.71	36.53	53.98	17.45	AV
7323	40.12	12.51	H	0.00	52.63	73.98	21.35	PK
7323	40.12	12.51	H	-18.71	33.92	53.98	20.06	AV

Scenario2

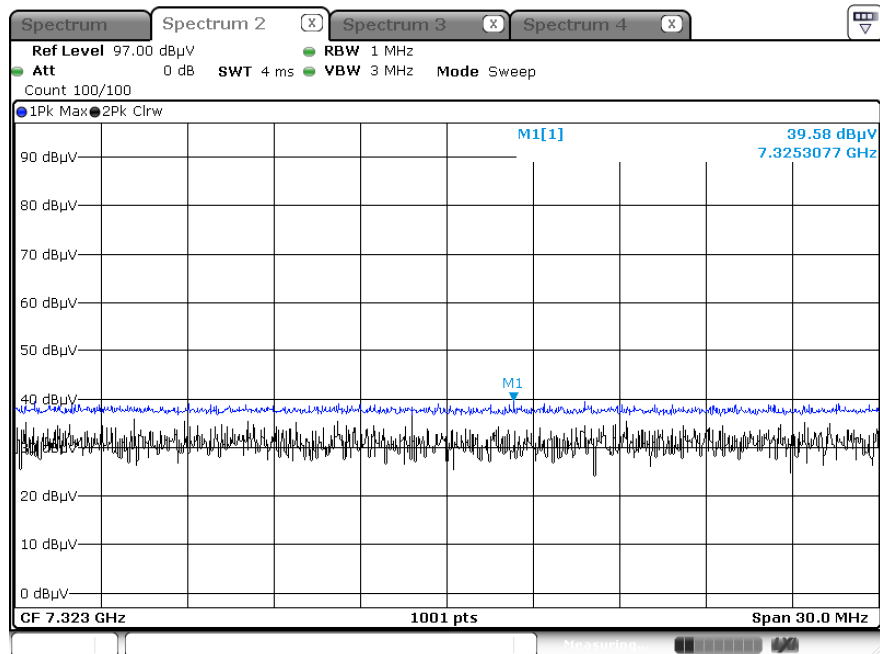
Bluetooth Hopping Mode + 5 GHz 802.11a_Ch.157

Frequency	Measured value	A.F+C.L-A.G+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	49.96	5.26	V	0.00	55.22	73.98	18.76	PK
4882	49.96	5.26	V	-18.71	36.51	53.98	17.47	AV
7323	40.21	12.51	V	0.00	52.72	73.98	21.26	PK
7323	40.21	12.51	V	-18.71	34.01	53.98	19.97	AV
4882	50.28	5.26	H	0.00	55.54	73.98	18.44	PK
4882	50.28	5.26	H	-18.71	36.83	53.98	17.15	AV
7323	39.73	12.51	H	0.00	52.24	73.98	21.74	PK
7323	39.73	12.51	H	-18.71	33.53	53.98	20.45	AV

Test Plots

Note: Plots of worst case are only reported.

Radiated Spurious Emissions plot – Peak & Average Result (π /4DQPSK, Ch. 39 3rd Harmonic, X-V)

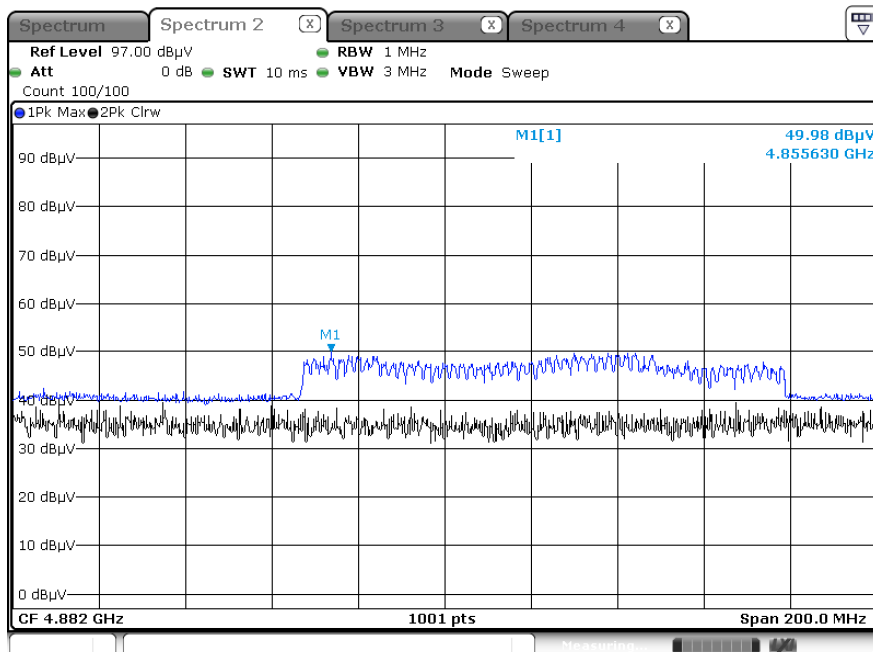


[Simultaneous transmission Scenario]

Scenario1

Bluetooth Hopping Mode + 2.4 GHz 802.11n_Ch.1

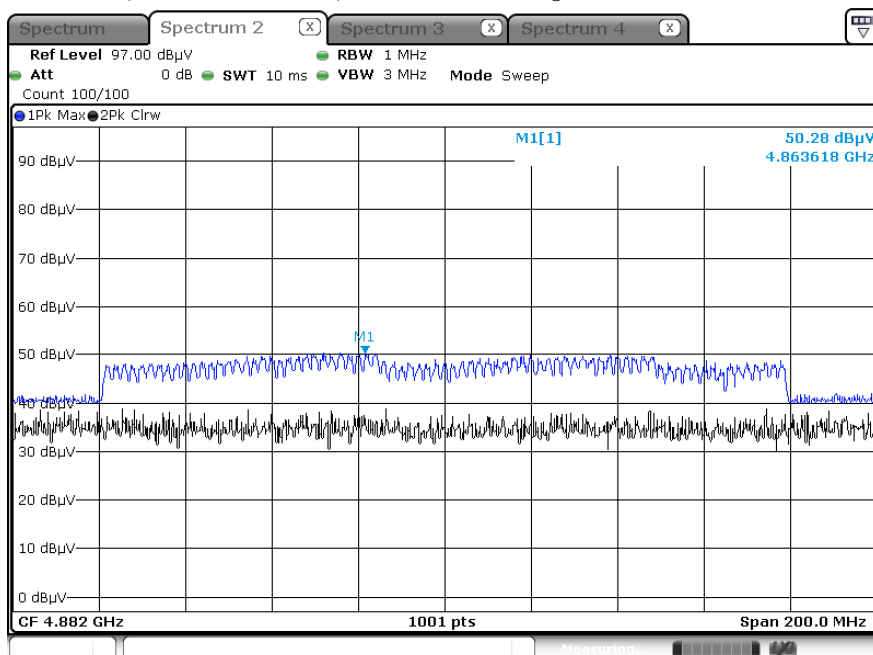
Radiated Spurious Emissions plot – Peak & Average Result (2nd Harmonic, X-H)



Scenario2

Bluetooth Hopping Mode + 5 GHz 802.11a_Ch.157

Radiated Spurious Emissions plot – Peak & Average Result (2nd Harmonic, Y-H)



10.3 RADIATED RESTRICTED BAND EDGES

Operation Mode	Normal(GFSK)
Operation Frequency	2 402 MHz, 2 480 MHz
Channel No	0, 78

Frequency	Measured Value	A.F+C.L-A.G+ ATT+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	54.32	-	V	0	54.32	73.98	19.66	PK
2390.0	54.32	-	V	-24.73	29.59	53.98	24.39	AV
2483.5	56.18	-	V	0	56.18	73.98	17.80	PK
2483.5	56.18	-	V	-24.73	31.45	53.98	22.53	AV

Operation Mode	EDR($\pi/4$ DQPSK)
Operation Frequency	2 402 MHz, 2 480 MHz
Channel No	0, 78

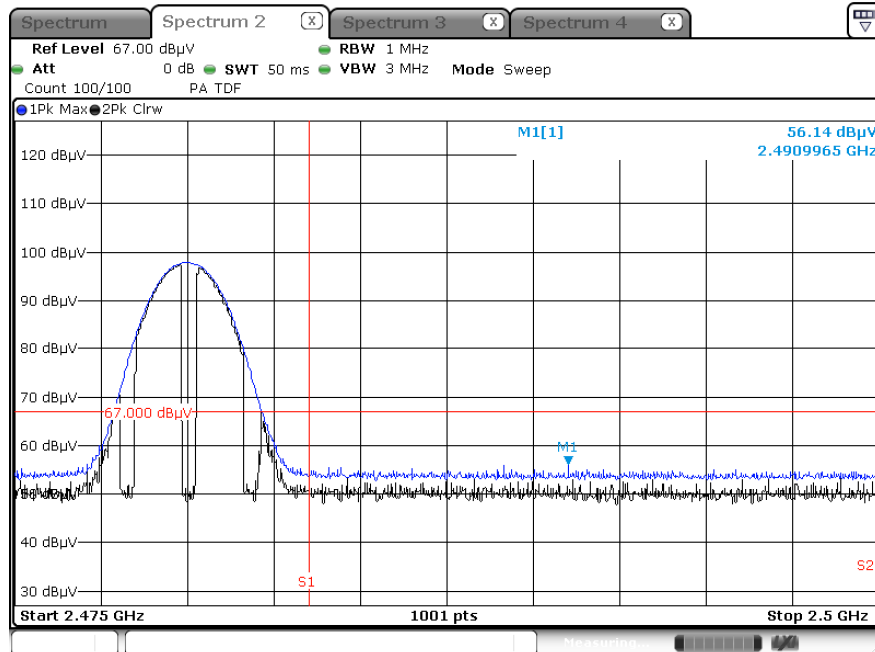
Frequency	Measured Value	A.F+C.L-A.G+ ATT+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	54.21	-	V	0	54.21	73.98	19.77	PK
2390.0	54.21	-	V	-18.71	35.50	53.98	18.48	AV
2483.5	56.01	-	V	0	56.01	73.98	17.97	PK
2483.5	56.01	-	V	-18.71	37.30	53.98	16.68	AV

Operation Mode	EDR(8DPSK)
Operation Frequency	2 402 MHz, 2 480 MHz
Channel No	0, 78

Frequency	Measured Value	A.F+C.L-A.G+ ATT+D.F	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	54.23	-	V	0	54.23	73.98	19.75	PK
2390.0	54.23	-	V	-18.71	35.52	53.98	18.46	AV
2483.5	56.14	-	V	0	56.14	73.98	17.84	PK
2483.5	56.14	-	V	-18.71	37.43	53.98	16.55	AV

Test Plots

Radiated Restricted Band Edges plot – Average & Peak Result (8DPSK, Ch. 78, Y-V)



Note:

Plots of worst case are only reported.

10.4 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

Frequency	Measured Value	A.F+C.L-A.G+D.F	POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]
No Critical peaks found						

11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/15/2026	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	08/20/2026	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/11/2026	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	02/18/2026	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	100935	07/24/2026	Annual
Power Meter	N1911A	Agilent	MY45100523	02/21/2026	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/04/2026	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/14/2026	Annual
Power Splitter	11667B	Hewlett Packard	10545	01/23/2026	Annual
DC Power Supply	E3632A	Agilent	KR75303243	04/16/2026	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	05/27/2026	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	05/19/2026	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	02/18/2026	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	12/27/2025	Annual
Automation Software	FCC WLAN Conducted	HCT CO., LTD	N/A	N/A	N/A
Automation Software	FCC Bluetooth Conducted	HCT CO., LTD	N/A	N/A	N/A

Note:

- Equipment listed above that calibrated during the testing period was set for test after the calibration.
- Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S1AM	07/25/2026	Annual
Turn Table	DS2000-S-1t	Innco system	DS2000/572/54610422/P	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	T&M system	TM19050002	N/A	N/A
Loop Antenna	1513	Schwarzbeck	1513-175	01/06/2027	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/03/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-2296	05/16/2026	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/07/2026	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	12/26/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	05/27/2026	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	05/27/2026	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	02/21/2026	Annual
Power Amplifier	CBL18265035	CERNEX	22966	10/21/2026	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/19/2026	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/12/2026	Annual
RF Switching System	FMSR-05B (HPF(3~18GHz) + LNA1(1~18GHz))	T&M system	S1L1	12/23/2025	Annual
RF Switching System	FMSR -05B (ATT(10dB) + LNA1(1~18GHz))	T&M system	S1L2	12/23/2025	Annual
RF Switching System	FMSR -05B (ATT(3dB) + LNA1(1~18GHz))	T&M system	S1L3	12/23/2025	Annual
RF Switching System	FMSR -05B (LNA1(1~18GHz))	T&M system	S1L4	12/23/2025	Annual
RF Switching System	FMSR -05B (HPF(7~18GHz) + LNA2(6~18GHz))	T&M system	S1L5	12/23/2025	Annual
RF Switching System	FMSR -05B (Thru(30MHz ~ 18GHz))	T&M system	S1L6	12/23/2025	Annual
Automation Software	FCC WLAN Radiated	HCT CO., LTD	N/A	N/A	N/A
Attenuator(3 dB)	18B-03	Api tech.	1	04/21/2026	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

12. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2510-FI001-P